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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	Indra LAKSONO		
Title:	DEVICE AND METHOD FOR COMPRESSION OF A VIDEO STREAM		
App. No.:	09/819,147	Filed:	03-27-2001
Examiner:	LEE, Richard J.	Group Art Unit:	2613
Customer No.:	34456	Confirmation No.:	2664
Atty. Dkt. No.:	VIXS.0100010 (1459-VIXS001)		

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Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

RESUBMISSION OF APPEAL BRIEF

Dear Sir:

A Brief on Appeal for the above-identified Patent Application was submitted on September 9, 2004 and resubmitted on June 9, 2005 due to an error on the part of the Patent Office. A Notice of Non-Compliant Appeal Brief was mailed on August 8, 2005. The Notice indicated that the Brief failed to provide a concise statement of the issues with respect to the rejections of certain claims and that the Brief also failed to provide arguments with respect to these rejections. Moreover, the Notice indicated that the resubmitted Brief must comply with 37 C.F.R. Section 41.37. The Appellant thanks the Examiner for providing notice of these issues. The Appellant resubmits herewith a revised version of the previously submitted Brief on Appeal for entry and consideration by the Patent Office. The revised version is believed to be compliant with 37 C.F.R. Section 41.37 and to address all rejections upon appeal.

CERTIFICATE OF TRANSMISSION/MAILING
I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to the Commissioner for Patents on 9/27/05.

Judy Carey
Typed or Printed Name

Signature

The Commissioner is hereby authorized to charge any fees that may be required, or credit any overpayment, to Deposit Account Number 50-1835.

Respectfully submitted,

27 September 2005
Date

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APPENDIX A

PATENT

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In re Application of:	Indra LAKSONO		
For:	DEVICE AND METHOD FOR COMPRESSION OF A VIDEO STREAM		
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BRIEF ON APPEAL

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This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 41.37(c)(1)):

TABLE OF CONTENTS

The final page of this brief before the beginning of the Appendix of Claims bears the attorney's signature.

I. REAL PARTY IN INTEREST (37 C.F.R. § 41.37(c)(1)(i))

The real party in interest in this appeal is ViXS Systems, Inc.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 41.37(c)(1)(ii))

There are no interferences or other appeals that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. § 41.37(c)(1)(iii))

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

There are sixty-two (62) claims pending in the application (claims 1-4, 6-13, 15-20, 22-58, 60, 61, 63-65, 67 and 68).

B. STATUS OF ALL THE CLAIMS

1. Claims pending:

   Claims 1-4, 6-13, 15-20, 22-58, 60, 61, 63-65, 67 and 68.

2. Claims withdrawn from consideration but not canceled:

   Claims 22-56.

3. Claims allowed:

   NONE.

4. Claims objected to:

   NONE.

5. Claims rejected:

Claims 1-4, 6-13, 15-20, 57, 58, 60, 61, 63-65, 67 and 68 are rejected under 35 U.S.C. § 103.

6. Claims canceled:

Claims 5, 14, 21, 59, 62 and 66.

C. CLAIMS ON APPEAL

There are twenty-seven (27) claims on appeal, claims 1-4, 6-13, 15-20, 57, 58, 60, 61, 63-65, 67 and 68.

IV. STATUS OF AMENDMENTS (37 C.F.R. § 41.37(c)(1)(iv))

In the response to the Final Office Action dated March 10, 2004, claim amendments were submitted. The proposed claim amendments were submitted to overcome informalities associated with the claims and not to change the scope of the recited invention. In the Advisory Action mailed May 25, 2004, the box associated with Item 7b of the PTO form has been checked, thereby indicating that the proposed amendments have been entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER (37 C.F.R. § 41.37(c)(1)(v))

The following summary is provided to give the Board the ability to quickly determine where the claimed subject matter appealed herein is described in the present application and is not to limit the scope of the claimed invention.

The claimed subject matter relates to transcoding video streams and, in particular, transcoding MPEG video streams. Figure 1 (reproduced below) illustrates a system whereby an MPEG video stream is received as a video input at an MPEG decoder 110. As provided by the MPEG standard, the MPEG video stream may comprise video data (such as I-frames, B-frames, P-frames, etc.) and motion vectors associated with the video data. As is well known in the art,

motion vectors are utilized to describe the motion of blocks of picture elements (pixels) across successive frames of video. The MPEG decoder 110 decodes the MPEG video stream and stores the video data in RAM 120 and stores the motion vectors in RAM 140. Subsequently, an MPEG encoder 150 coupled to the RAM 120 and the RAM 140 retrieves the video data from RAM 120 and scales the video data, where the scaling may comprise upscaling (when the resolution of the video image is to be increased) or downscaling (when the resolution of the video image is to be decreased). The MPEG encoder 150 then retrieves the motion vectors associated with the scaled video data from the RAM 140 and encodes the scaled video data using the retrieved motion vectors. The motion vectors may be used directly to encode the scaled video data or new motion vectors may be generated from the old motion vectors and these new motion vectors then may be used during the encoding of the video data. The new motion vectors may be generated by, for example, scaling the original motion vectors in proportion to the scaling of the video data, determining an average motion vector from a plurality of the original motion vectors or determining a most frequently occurring motion vector.

Figure 2 (reproduced below) illustrates these steps in more detail. Step 235 represents saving motion vectors to a storage area, such as memory 140 of Figure 1 after a video input is decoded (steps 210-250). Step 245 represents the scaling of the video data. Step 270 represents the retrieval of the original motion vectors from the storage area. Step 275 represents the creation of new motion vectors from the original motion vectors and steps 280-295 represent the process of encoding the scaled video data using the new motion vectors.

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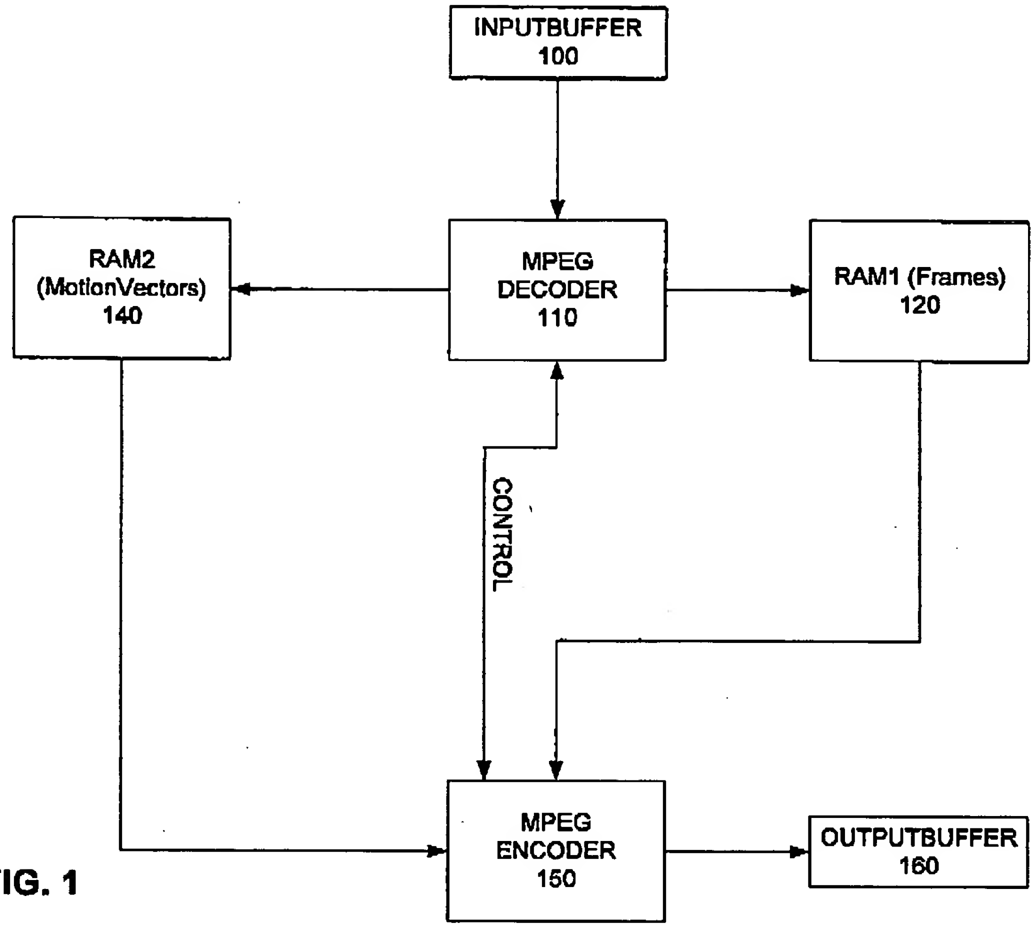


FIG. 1

The Present Application, Figure 1

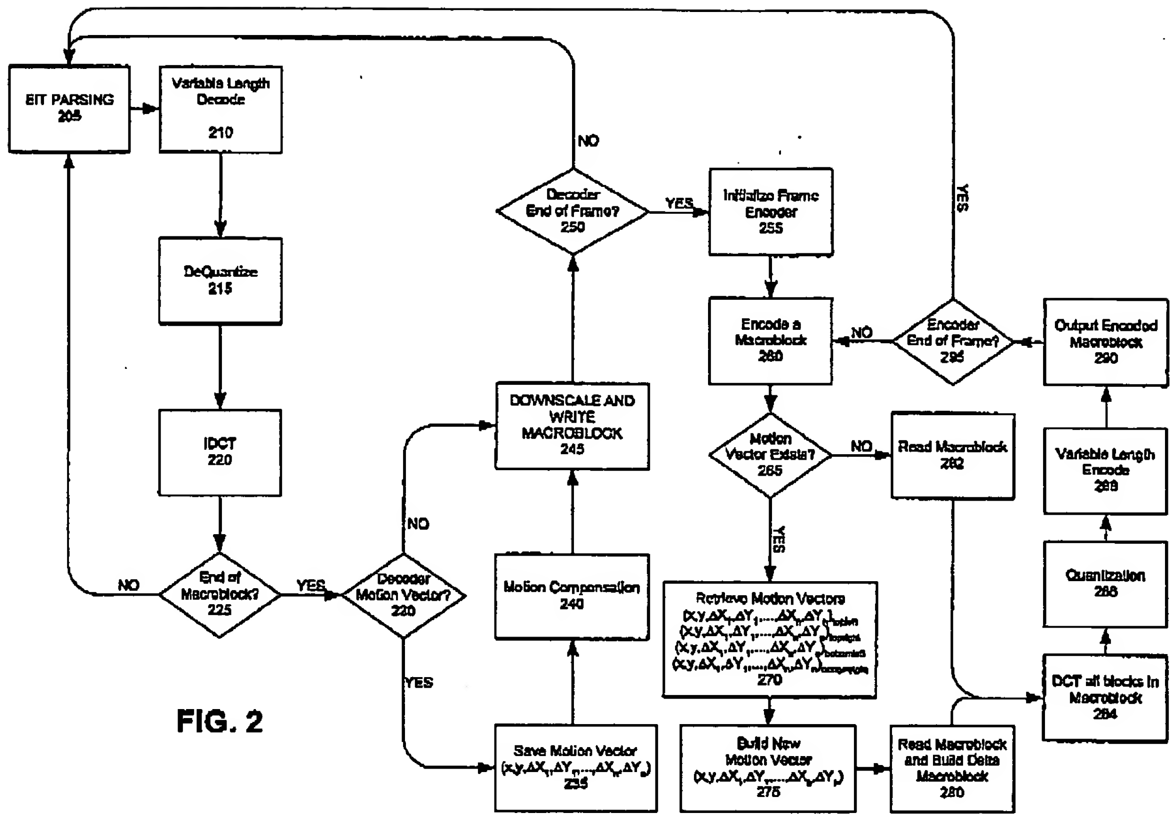


FIG. 2

The Present Application, Figure 2

As provided by the present application, the above-described process "avoids the computationally intensive motion estimation step by retrieving motion vectors previously saved in memory, RAM2 140. By retrieving the set of surrounding motion vectors and building a new set of motion vectors, the encoder 150 avoids the expensive search that is required in conventional motion estimation." *Present Application*, p. 3, lines 11-15.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R. § 41.37(c)(1)(vi))

A. Claims 1-4, 6, 10-13, 60, 62, 63, 67 and 68 are rejected under 35 U.S.C. § 103 as unpatentable over United States Patent No. 5,635,985 to *Boyce et al* (hereinafter, "the *Boyce* reference") in view of United States Patent No. 6,005,623 to *Takahashi et al* (hereinafter, "the *Takahashi* reference") as set forth in the Final Office Action dated March 10, 2004 (hereinafter, "the Final Action") and the subsequent Advisory Action dated May 25, 2004 (hereinafter, "the Advisory Action").

B. Claims 7, 8, 15, 17, 19 and 20 are rejected under 35 U.S.C. § 103 as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of United States Patent No. 6,005,624 to *Video Trancoding By Reducing Spatial Resolution* (hereinafter, "the *Yin* reference") as set forth in the Final Action and the subsequent Advisory Action.

C. Claims 9, 16 and 18 are rejected under 35 U.S.C. § 103 as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of United States Patent No. 6,005,624 to *Samad et al* (hereinafter, "the *Samad* reference") as set forth in the Final Action and the subsequent Advisory Action.

D. Claims 57, 58, 64 and 65 are rejected under 35 U.S.C. § 103 as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of United States Patent No. 6,005,624 to *Vainsencher* (hereinafter, "the *Vainsencher* reference") as set forth in the Final Action and the subsequent Advisory Action.

E. Claim 61 is rejected under 35 U.S.C. § 103 as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of United States Patent No.

6,005,624 to *Mogeat et al* (hereinafter, "the *Samad* reference") as set forth in the Final Action and the subsequent Advisory Action.

F. Claim 10 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite as set forth in the Final Action and the subsequent Advisory Action.

VII. ARGUMENTS (37 C.F.R. § 41.37(c)(1)(vii))

Based on the arguments and issues below, none of the claims stand or fall together, because in addition to having different scopes, each of the independent claims has a unique set of issues relating to its rejection and appeal as indicated in the arguments below:

A. Rejection of Claims 1-4, 6, 10-13, 60, 62, 63, 67 and 68 under 35 U.S.C. § 103 (37 C.F.R. §1.192(c)(8)(iv)):

In Section 5 of the Final Action, claims 1-4, 6, 10-13, 60, 62, 63, 67 and 68 were rejected under 35 U.S.C. § 103(a) as unpatentable over the *Boyce* reference in view of the *Takahashi* reference. Claims 1 and 11, from which claims 2-4, 6, 10, 12, 13, 60, 62, 63, 67 and 68 respectively depend, are reproduced below for ease of reference.

1. (Previously Presented) A system comprising:
   a video decoder to receive a video input stream having one or more first motion vectors, the video decoder to provide decoded video and the first motion vectors associated with the video input stream;
   a first memory coupled to the video decoder to store the first motion vectors;
   a scaler coupled to receive the decoded video and to provide a scaled video; and
   an encoder coupled to the scaler and the first memory to provide a compressed representation of the scaled video using the first motion vectors saved in the first memory.

11. (Previously Presented) A method comprising:

determining a plurality of first motion vectors associated with a compressed first video image;

storing the plurality of first motion vectors (a stored plurality of first motion vectors);

generating one or more second motion vectors based on the stored plurality of first motion vectors; and

generating a compressed second video image based upon one or more second motion vectors, wherein the second video image is a scaled representation of the first video image.

According to 35 U.S.C. § 103(a), "[a] patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art of such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing *a prima facie* case of obviousness. *In re Fritch*, 972 F.2d 1260,1262,23 U.S.P.Q. 2d 1780, 1783 (Fed. Cir. 1992). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. *In re Oetiker,* 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki,* 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984). Only when a *prima facie* case of obviousness is established does the burden shift to the applicant to produce evidence of nonobviousness. *In re Oetiker,* 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert, 9* F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). If the Patent Office does not produce *a prima facie* case of unpatentability, then without more the applicant is entitled to grant of a

patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. *In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

The Final Action asserts that the proposed combination of the *Boyce* reference and the *Takahashi* reference disclose the claimed invention as recited by claims 1-4, 6, 10-13, 60, 62, 63, 67 and 68. The Appellant disagrees and submits that the proposed combination of the *Boyce* reference and the *Takahashi* reference fails to disclose or suggest each and every limitation recited by claims 1-4, 6, 10-13, 60, 62, 63, 67 and 68. Furthermore, the Appellant submits that there is no motivation to combine the *Boyce* reference and the *Takahashi* reference as proposed in the Final Action.

1) <u>The *Boyce* Reference Fails to Disclose Storing Motion Vectors</u>

Claim 1 recites, in part, the limitations of a video decoder to provide first motion vectors associated with a video input stream, a first memory coupled to the video decoder to store the first motion vectors, and an encoder coupled to the first memory to provide a compressed

representation of scaled video data using the first motion vectors saved in the memory. The Appellant submits that the *Boyce* reference fails to disclose or suggest a first memory coupled to a video decoder and an encoder for the storage of motion vectors provided by the video coder for subsequent use by the encoder as recited in claim 1.

With regard to these limitations, the Final Action asserts that elements 120, 122, 124, 128, 129, 131-135, 202, 204, 206 and 208 of Figure 2A of the *Boyce* reference (reproduced below) are equivalent to the video decoder recited in claim 1 and further asserts that element 116 of Figure 2A of the *Boyce* reference illustrates "a first memory . . . coupled to the video decoder to store the first motion vectors, wherein storing the plurality of motion vectors further storing [sic] the plurality of first motion vectors in response to a mode indicator being in a first state" and cites the passage at col. 6, lines 18-38 of the *Boyce* reference in support of this assertion. *Final Action*, p. 4. However, the Appellant submits that the *Boyce* reference fails to disclose or suggest the storage of motion vectors, much less the storage of motion vectors in element 116 of Figure 2A of the *Boyce* reference as alleged by the Final Action.

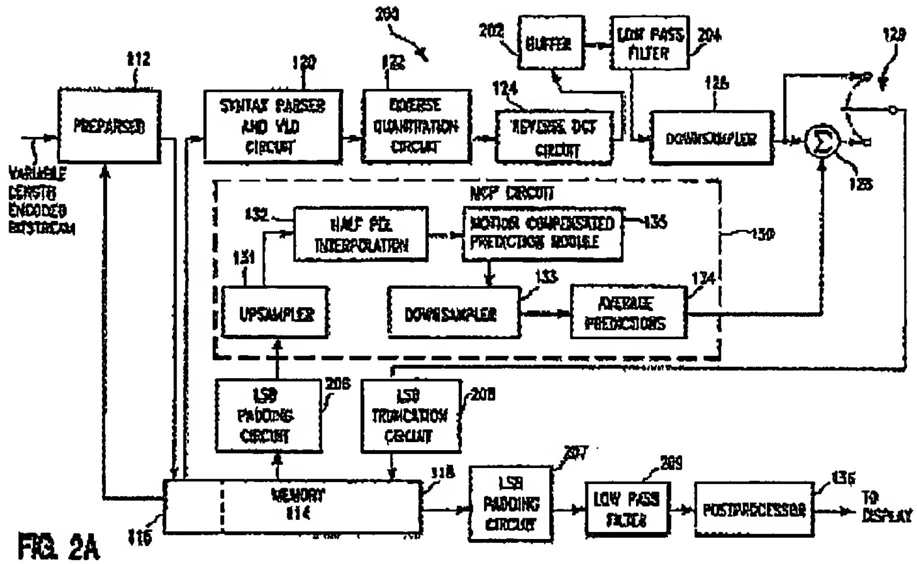


FIG. 2A

The Boyce Reference, Figure 2A

As Figure 2A of the *Boyce* reference illustrates, the output of the purported video decoder is coupled to a frame buffer 118, not the coded data buffer 116 as alleged by the Final Action. *See Boyce*, col. 10, lines 39-64. Regardless, the *Boyce* reference fails to disclose or suggest the storage of motion vectors in either of the coded data buffer 116 or the frame buffer 118. As disclosed by the *Boyce* reference, a preparser 112 is coupled to the coded data buffer 116, where "the preparser 112 operates to reduce the amount of HDTV data supplied to the coded data buffer [116]. It does this by selectively discarding some of the received HDTV data. By using the preparser 112 to parse and discard data prior to variable length decoding it is possible to operate the preparser 112 at a data rate that is a function of the data rate of the received bitstream." *Boyce*, col. 5, line 63 – col. 6, line 2. The *Boyce* reference further teaches that "[t]he preparser 112 performs several data reduction operations on a HDTV bitstream as required to insure that the processing capacity of the SP and VLD circuit 120 and *throughout capability of the coded data buffer 116 are not exceeded* . . . . By reducing the data rate as required, the

preparser 112 also *serves to reduce the coded data buffer size requirements because the coded data buffer 116 need only be capable of storing a reduced amount of data*." *Id.*, col. 6, lines 27-38 (emphasis added).

The only reference to motion vectors during the decoding process in the *Boyce* reference discloses that "[t]he preparser 112 parses the incoming bitstream, without performing a complete variable length decode operation, . . . *to identify* MPEG coding elements such as macroblocks including motion vectors and DCT coefficients associated with each of the identified frames in the received data stream." *Id.*, col. 6, lines 17-26. This passage provides only that the motion vectors are *identified* by the preparser 112 and does not indicate that the motion vectors are stored by the preparser 112 in the coded data buffer 116. The Appellant submits that the preparser 112 presumably identifies the MPEG coding elements, including the motion vectors, for the purpose of discarding the MPEG coding elements, as would be consistent with the stated purposes of the preparser 112 to reduce the data rate, to "reduce the coded data buffer size requirements," and to "selectively [discard] some of the received HDTV data."

Moreover, the *Boyce* reference teaches that the "downsampled frames supplied by the frame buffer 118 to the MCP circuit 130 are upsampled . . ., interpolated and then downsampled prior to generating predictions based on the motion vectors. In this manner the motion vectors which were originally generated based on the full resolution video frames are effectively applied to downsampled video frames." *Id.*, col. 11, lines 58-65. Thus, the *Boyce* reference teaches motion estimation by upsampling and interpolation, thereby rendering the original motion vectors redundant. The storage of redundant or unused information, such as the original motion vectors, in the coded data buffer 116 would only result in needlessly occupying space in the coded data buffer 116, and thus, the storage of the original motion vectors in the coded data

buffer 116 by the preparser 112 would be contrary to the teachings of the *Boyce* reference as the above-identified passages of the *Boyce* reference teach that the purpose of the preparser 112 is to reduce the data rate of the incoming bit stream and to maintain the coded data buffer 116 within its limits.

Even if, *arguendo*, the *Boyce* reference disclosed the storage of the motion vectors in the coded data buffer 116, it will be appreciated that the coded data buffer 116 is coupled to the input of the purported video decoder of Figure 2A of the *Boyce* reference, so the purported video decoder cannot "provide the first motion vectors" as recited by claim 1. Instead, the purported video decoder only receives data from the coded data buffer 116.

Claim 11 recites, in part, the similar limitations of storing a plurality of first motion vectors. As the *Boyce* reference fails to disclose or suggest a first memory to store motion vectors as discussed above, the *Boyce* reference necessarily fails to disclose or suggest the storage of a plurality of first motion vectors. In view of the foregoing, the Appellant submits that the Final Action fails to establish that the *Boyce* reference discloses or suggests the limitations of a first memory operably coupled to a video decoder to store first motion vectors as recited by claim 1 and the limitations of storing a plurality of motion vectors as recited by claim 11.

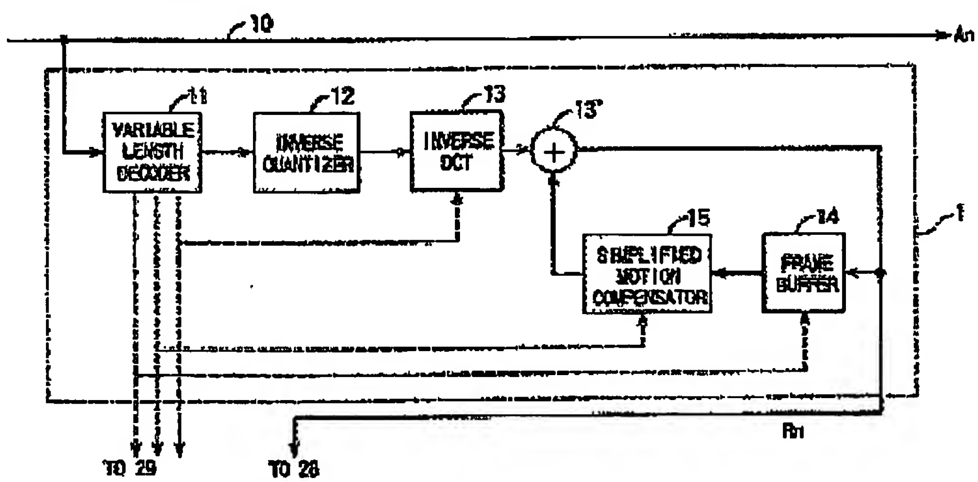
2) <u>The *Takahashi* reference Fails to Disclose Storing Motion Vectors</u>

The Final Action relies on Takahashi as purportedly disclosing an encoder coupled to a scaler and a first memory (allegedly element 26 of Figure 2C) "to provide a compressed representation of the scale video using first motion vectors" and cites the passage at col. 9, lines 23-44 of the *Takahashi* reference in support of this assertion. However, this passage states that "the side information obtained during data decoding, including . . . motion vector information, is applied to the scaling circuit 29 whereby the information is scaled and used for coding."

Takahashi, col. 9, lines 27-31. As Figures 2B and 2C of Takahashi (reproduced below) illustrate, this "side information" is provided directly from the variable length decoder 11 to the scaling circuit 29.

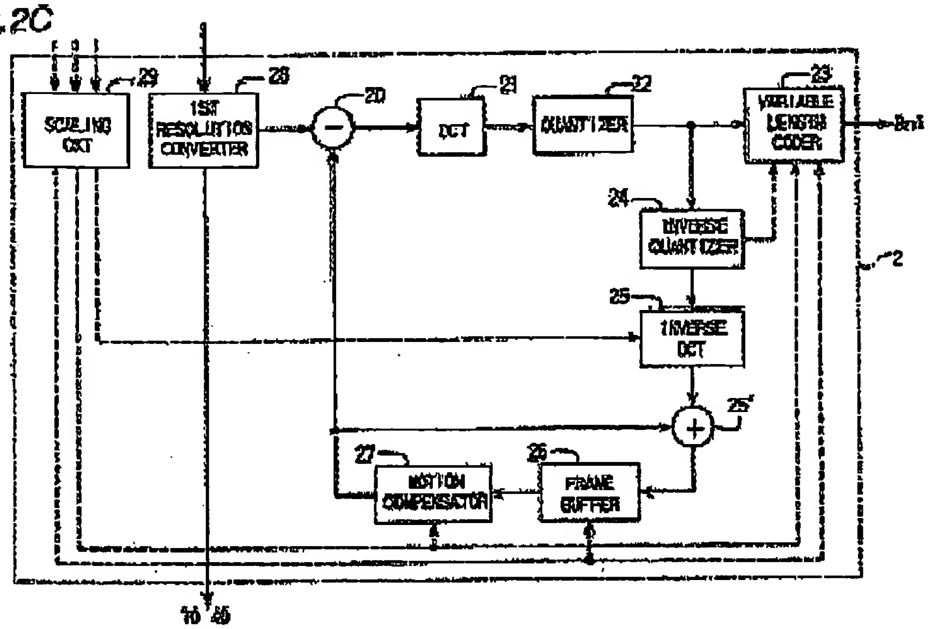
The *Takahashi* reference neither discloses nor suggests that this side information is stored in memory between the variable length decoder 11 and the scaling circuit 29. Accordingly, the *Takahashi* reference neither discloses nor suggests the limitations of a first memory coupled to store first motion vectors from a video decoder as recited by claim 1 or the limitations of storing a plurality of motion vectors and generating one or more second motion vectors based on the stored plurality of first motion vectors as recited by claim 11.

Fig.2B



The Takahashi Reference, Figure 2B

Fig.2C



The Takahashi Reference, Figure 2C

3) <u>The Proposed Combination of the *Boyce* and *Takahashi* References Does Not Disclose or Suggest Each and Every Limitation of the Claims Under Appeal</u>

As noted above, neither the *Boyce* reference nor the *Takahashi* reference discloses or suggests the limitations of a first memory coupled to store motion vectors provided by a video decoder as recited in claim 1 or the limitations of storing a plurality of motion vectors and generating one or more second motion vectors based on the stored plurality of first motion vectors as recited by claim 11. The Appellant submits that the combination of the *Boyce* reference and the *Takahashi* reference as proposed in the Final Action consequently fails to disclose or suggest at least these limitations. As such, the proposed combination of the *Boyce* reference and the *Takahashi* reference fails to disclose or suggest each and every limitation of claims 1 and 11 and the Final Action therefore has failed to establish that the proposed

combination of the *Boyce* reference and the *Takahashi* reference discloses or suggests each and every claim depending from claims 1 or 11 at least by virtue of this dependency.

4) There is No Motivation to Combine the Boyce and *Takahashi* references

The Appellant respectfully submits that not only do the *Boyce* and *Takahashi* references fail to disclose or suggest each and every limitation of the claims under appeal, neither the Boyce and *Takahashi* references nor the knowledge of one of ordinary skill in the art provide any motivation for the combination of the *Boyce* and *Takahashi* references as suggested by the Final Action. In fact, the proposed combination of the *Boyce* and *Takahashi* references is contrary to the goals of both the *Boyce* reference and the *Takahashi* reference.

The Appellant submits that the nature of the problems solved by the *Boyce* reference and the *Takahashi* reference are different and no suggestion or motivation to combine the references therefore is provided. Specifically, the *Boyce* reference identifies reducing memory in decoders as a problem to be resolved in obtaining a low-cost decoder. *See Boyce*, col. 2, lines 1-25. The *Takahashi* reference focuses on the problem of maintaining high-quality images transmitted by a television broadcast station, such as high-definition television (HDTV) video. *See Takahashi*, col. 3, line 34 *et seq*. The Final Action states that one of ordinary skill "having the Boyce et al and Takahashi et al references in front of him/her and the general knowledge of video transcoders, would have had no difficulty in providing" the recited invention. *Final Action*, p. 6. The Final Action, however, provides no extrinsic evidence in support of this broad assertion. Given the different nature of the problems being solved, absent some other showing, there is no motivation for an inventor to have the references in front of them, let alone to combine them.

Moreover, not only is there an absence of a suggestion to combine the *Boyce* and *Takahashi* references, such a combination would destroy the purpose of the invention of the

Boyce reference. Specifically, the *Boyce* reference is directed to a decoder having a reduced size memory buffer to provide a low cost decoder that is not capable of providing an HDTV picture quality. *See Boyce*, col. 4, line 31 *et seq*. The *Takahashi* reference discloses a system with two encoders that require HDTV quality be maintained. *Takahashi*, col. 7, line 63 *et seq*. The combination of the teachings of the *Takahashi* reference, which seeks to attain HDTV or near-HDTV quality, with the teachings of the *Boyce* reference prohibits the implementation of cost saving features required in the *Boyce* reference, such as reduced memory size.

The proposed combination of the *Boyce* and *Takahashi* references further destroys the purpose of the invention of the *Takahashi* reference as the *Boyce* reference discloses reducing the resolution of received high-definition (HD) pictures prior to decoding, thereby reducing the complexity of later processing stages of the decoder. In contrast, the *Takahashi* reference requires maintaining full HDTV video decoding quality. *See, e.g.*, *Takahashi*, the output to 28 in FIG. 2B and output to 40 in FIG. 2C. The data reduction of the *Boyce* reference prior to decoding destroys the ability of the *Takahashi* reference to maintain full HDTV video as is explicitly sought by the *Takashi* reference.

5) <u>The Final Action Fails to Establish a Valid § 103 Rejection of Claims 1-4, 6, 10-13, 60, 62, 63, 67 and 68</u>

As established in sections 1-4 above, the proposed combination of the *Boyce* and *Takahashi* references fails to disclose each and every limitation of claims 1 and 11. Moreover, even if the proposed combination of the *Boyce* and *Takahashi* references did disclose every limitation, there is no motivation to combine these references found in the references themselves or in the knowledge of one of ordinary skill in the art. In fact, such a combination would destroy the purpose of the *Boyce* reference and the *Takahashi* reference due to their incompatible goals.

Accordingly, the Appellant respectfully submits that the Final Action fails to establish a *prima facie* case of obviousness in support of its rejection of claims 1-4, 6, 10-13, 60, 62, 63, 67 and 68.

B. Rejection of Claims 7, 8, 15, 17, 19 and 20 under 35 U.S.C. § 103 (37 C.F.R. §1.192(c)(8)(iv)):

In Section 6 of the Final Action, claims 7, 8, 15, 17, 19 and 20 were rejected under 35 U.S.C. § 103(a) as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of the *Yin* reference. Claims 7 and 8 depend from claim 1 and claims 15, 17, 19 and 20 depend from claim 11. As discussed above with respect to claims 1 and 11, there is no motivation to combine the *Boyce* and *Takahashi* references, and even if combined, the proposed combination of the *Boyce* and *Takahashi* references fails to disclose or suggest each and every limitation of claims 1 and 11. The *Yin* reference does not disclose or suggest any of the limitations of claims 1 and 11, nor does the Final Action or the Advisory Action assert that the *Yin* reference teaches any of these limitations. Accordingly, the proposed combination of the *Boyce*, *Takahashi* and *Yin* references fails to disclose or suggest each and every limitation recited by claims 7, 8, 15, 17, 19 and 20 at least by virtue of their dependency from one of claims 1 or 11. The Final Action therefore fails to establish a *prima facie* case of obviousness in support of its rejection of claims 7, 8, 15, 17, 19 and 20.

C. Rejection of Claims 9, 16 and 18 under 35 U.S.C. § 103 (37 C.F.R. §1.192(c)(8)(iv)):

In Section 7 of the Final Action, claims 9, 16 and 18 were rejected under 35 U.S.C. § 103(a) as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of the *Samad* reference. Claim 9 depends from claim 1 and claims 16 and 18 depend from claim 11. As discussed above with respect to claims 1 and 11, there is no motivation to combine the *Boyce* and *Takahashi* references, and even if combined, the proposed combination

of the *Boyce* and *Takahashi* references fails to disclose or suggest each and every limitation of claims 1 and 11. The *Samad* reference does not disclose or suggest any of the limitations of claims 1 and 11, nor does the Final Action or the Advisory Action assert that the *Samad* reference teaches any of these limitations. Accordingly, the proposed combination of the *Boyce*, *Takahashi* and *Samad* references fails to disclose or suggest each and every limitation recited by claims 9, 16 and 18 at least by virtue of their dependency from one of claims 1 or 11. The Final Action therefore fails to establish a *prima facie* case of obviousness in support of its rejection of claims 9, 16 and 18.

D. Rejection of Claims 57, 58, 64 and 65 under 35 U.S.C. § 103 (37 C.F.R. §1.192(c)(8)(iv)):

In Section 8 of the Final Action, claims 57, 58, 64 and 65 were rejected under 35 U.S.C. § 103(a) as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of the *Vainsencher* reference. Claim 57, which depends from claim 1, and Claim 64, which depends from claim 11, are reproduced below for ease of reference:

57. (Previously Presented) The system of claim 1, wherein the first memory comprises a hard drive.

64. (Previously Presented) The system of claim 11, wherein the storing the first motion vectors includes storing the first motion vectors on a hard drive.

The Final Action asserts that the proposed combination of the *Boyce* reference, the *Takahashi* reference and the *Vainsencher* reference discloses the recited invention of claims 57, 58, 64 and 65. The Appellant disagrees and submits that the proposed combination of the *Boyce*, *Takahashi* and *Vainsencher* references fails to disclose or suggest each and every limitation recited by claims 1 and 11, from which claims 57, 58, 64 and 65 depend, respectively. This

proposed combination also fails to disclose or suggest each and every additional limitation recited in claims 57, 58, 64 and 65. Additionally, the Appellant submits that there is no motivation to combine the *Boyce* reference, the *Takahashi* reference and the *Vainsencher* reference as proposed in the Final Action.

1) The *Vainsencher* Reference Fails to Disclose or Suggest Storing Motion Vectors in a Hard Drive

As noted above, claim 1, from which claim 57 depends, recites, in part, the limitations of a first memory coupled to a video decoder to store first motion vectors from a video input stream received at the video decoder and coupled to an encoder which uses the first motion vectors saved in the first memory to provide a compressed representation of scaled video. Claim 57 recites the additional limitations of wherein the first memory comprises a hard drive. As also noted above, claim 11 recites, in part, the limitations of storing a plurality of first motion vectors associated with a compressed first video image and generating one or more second motion vectors based on the stored plurality of first motion vectors. Claim 64, which depends from claim 11, recites the additional limitations of wherein storing the first motion vectors includes storing the first motion vectors on a hard drive.

The Final Action relies on the *Boyce* reference and the *Takahashi* reference as purportedly disclosing the limitations of claims 1 and 11, from which claims 57 and 64 depend, respectively, and relies on the *Vainsencher* reference as allegedly disclosing the additional limitations recited by claims 57 and 64. Specifically, the Final Action asserts that "Vainsencher discloses a system for performing motion compensation as shown in Figures 1-3, and teaches the conventional use of a memory (112 of Figure 3) coupled to a video decoder . . . to store all plurality [sic] of first motion vectors used to build a frame of the compressed video image."

Final Action, p. 10. The Final Action admits that the *Vainsencher* reference teaches that the memory is an SDRAM "and not a hard drive memory as claimed." *Id.* Instead, the Final Action relies on the depiction of a hard drive 90 in Figure 2 of the *Vainsencher* reference and asserts that "[i]t is however considered obvious that such hard drive memory of Vainsencher [i.e., the hard drive 90 of Figure 2] may certainly be used for storing the motion vectors in place of the SDRAM memory." *Id.* The Appellant disagrees and submits that the *Vainsencher* reference fails to disclose or even suggest the use of a hard drive as recited by claims 57 and 64.

The Appellant notes that the hard drive 90 of Figure 2 of the *Vainsencher* reference is referenced only a single time (at col. 6, lines 45-47), and this single reference discloses only that "[v]arious other components may be comprised in the computer system [60], such as video 88 and hard drive 90." No passage of the *Vainsencher* reference discloses or suggests that motion vectors, or any other video data for that matter, may be stored in the hard drive 90. Nor would such hard drive storage be necessary in the system of the *Vainsencher* reference as the *Vainsencher* reference provides a frame-store memory 112 (which the Final Action admits is not a hard drive) for the storage of motion vectors. Moreover, the system of the *Vainsencher* reference is directed to an "MPEG decoder [that] stores reference block data according to a novel skewed tile arrangement to minimize the maximum number of page crossings required in retrieving this data from the memory." *Vainsencher*, Abstract. As will be appreciated by one of ordinary skill in the art, page crossings are specific to random access memory, such as SDRAM, and are not applicable to hard drives.

Moreover, the *Vainsencher* reference discloses that "[a] new system and method is further desired which provides guaranteed performance characteristics." *Id.*, col. 4, lines 34-35. As will be appreciated by one of ordinary skill in the art, the latency associated with a disk drive

access is substantially greater (*i.e.*, often one, two or even more orders of magnitude) than the latency associated with a RAM access. Accordingly, the use of the hard drive 90 for the storage of motion vectors as proposed by the Final Action not only would be contrary to the goal of "guaranteed performance characteristics" sought by the *Vainsencher* reference but would also be contrary to conventional MPEG processing systems wherein RAM storage of video data is standard. Accordingly, the assertion in the Final Action that the use of a hard drive to store motion vectors is obvious solely based on the disclosure of a non-hard drive frame-store memory 112 in the *Vainsencher* reference may be attributed only to improper hindsight provided by the teachings of the present application.

2) There is No Motivation to Combine the Boyce, Takahashi and *Vainsencher* references.

Even if, *arguendo*, the *Vainsencher* reference suggested the use of a hard drive to store motion vectors as recited by claims 57 and 64 (which it does not), there would be no motivation to combine the *Boyce*, *Takahashi* and *Vainsencher* references as proposed by the Final Action. The systems of the *Boyce* and *Takahashi* references are directed to pipeline systems whereby video data is processed in real-time (or near real-time). As noted above, the use of a hard drive to store motion vectors would cause substantial delays due to the latency involved with access to the hard drive. Such substantial delays would be contrary to the pipeline operations of the systems of the *Boyce*, *Takahashi* and *Vainsencher* references and would frustrate their ability to operate at or near real-time. This incompatibility not only provides no motivation for one of ordinary skill in the art to combine the teachings of the *Boyce*, *Takahashi* and *Vainsencher* references as proposed by the Final Action, it provides a motivation for one in the ordinary skill in the art to avoid making such a combination.

3) <u>The Final Action Fails to Establish a Valid § 103 Rejection of Claims 57, 58, 64 and 65</u>

As established above, the proposed combination of the *Boyce*, *Takahashi* and *Vainsencher* references fails to disclose each and every limitation of claims 57, 58, 64 and 65. Moreover, even if this proposed combination did disclose every limitation, this proposed combination would be improper because there is no motivation to combine these references found in the references themselves or in the knowledge of one of ordinary skill in the art as the combination proposed by the Final Action would frustrate the goals of the references. Accordingly, the Appellant respectfully submits that the Final Action fails to establish a *prima facie* case of obviousness in support of its rejection of claims 57, 58, 64 and 65.

E. Rejection of Claim 61 under 35 U.S.C. § 103 (37 C.F.R. §1.192(c)(8)(iv)):

In Section 9 of the Final Action, claim 9 was rejected under 35 U.S.C. § 103(a) as unpatentable over the *Boyce* reference in view of the *Takahashi* reference and further in view of the *Mogeat* reference. Claim 61 depends from claim 1. As discussed above with respect to claim 1, there is no motivation to combine the *Boyce* and *Takahashi* references, and even if combined, the proposed combination of the *Boyce* and *Takahashi* references fails to disclose or suggest each and every limitation of claim 1. The *Mogeat* reference does not disclose or suggest any of the limitations of claim 1, nor does the Final Action or the Advisory Action assert that the *Mogeat* reference teaches any of these limitations. Accordingly, the proposed combination of the *Boyce*, *Takahashi* and *Mogeat* references fails to disclose or suggest each and every limitation recited by claim 61 at least by virtue of its dependency from claim 1. The Final Action therefore fails to establish a *prima facie* case of obviousness in support of its rejection of claim 61.

F. Rejection of Claim 10 under 35 U.S.C. § 112 (37 C.F.R. §1.192(c)(8)(iv)):

In Section 3 of the Final Action, claim 10 was rejected under 35 U.S.C. Section § 112, second paragraph, as being indefinite. Specifically, the Final Action asserts that because claim 10 claims an MPEG data input stream, claim 10 is allegedly indefinite "because there are many versions of the MPEG recommendations and the recommendations are continuously updated. The scope of the claim limitations cannot change over time, and unless the applicant provides in the remarks section of a response to [the Final Action] stating the specific MPEG version with the date or a copy of the MPEG recommendation is provided, the claim is considered indefinite." *Final Action*, p. 3. In response to this rejection, the Appellant provided the following statement in the numerous responses: "to the extent necessary, the recitation of MPEG should be limited to those variations of MPEG known at the time of filing. . . The Office is requested to reconsider its position that one of ordinary skill in the art could readily determined that specific MPEG recommendation versions with a data based on the filing date of the present application." *See Response to Final Action*, p. 12.

The Appellant submits that this statement is sufficient to particularly point out and define which MPEG recommendations are applicable in view of claim 10. The indefinite rejection of claim 10 therefore should be withdrawn.

VIII. CONCLUSION

For the reasons given above, the Appellant respectfully requests reconsideration and allowance of all claims and that this patent application be passed to issue.

Respectfully submitted,

9-27-05

Date

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IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL (37 C.F.R. § 41.37(c)(1)(viii))

The text of each claim involved in the appeal is as follows:

1. (Previously Presented) A system comprising:
   a video decoder to receive a video input stream having one or more first motion vectors, the video decoder to provide decoded video and the first motion vectors associated with the video input stream;
   a first memory coupled to the video decoder to store the first motion vectors;
   a scaler coupled to receive the decoded video and to provide a scaled video; and
   an encoder coupled to the scaler and the first memory to provide a compressed representation of the scaled video using the first motion vectors saved in the first memory.

2. (Original) The system of claim 1 further comprising:
   a second memory coupled to the video decoder to store a representation of the decoded video.

3. (Original) The system of claim 2, wherein the representation of the decoded video is the decoded video.

4. (Original) The system of claim 2, wherein the scaler is a down-scaler.

5. (Canceled)

6. (Original) The system of claim 1, wherein the video encoder has a vector generation portion that provides second motion vectors based on the first motion vectors saved in the first memory.

7. (Original) The system of claim 6, wherein a specific vector of the second motion vectors is based on a plurality of vectors of the first motion vectors.

8. (Original) The system of claim 6, wherein a specific vector of the second motion vectors is based on an average of at least two vectors of the first motion vectors.

9. (Original) The system of claim 6, wherein a specific vector of the second motion vectors is based on a most frequently occurring vector of the first motion vectors.

10. (Original) The system of claim 6, wherein the video input is an MPEG data input stream.

11. (Previously Presented) A method comprising:

determining a plurality of first motion vectors associated with a compressed first video image;

storing the plurality of first motion vectors (a stored plurality of first motion vectors);

generating one or more second motion vectors based on the stored plurality of first motion vectors; and

generating a compressed second video image based upon one or more second motion vectors, wherein the second video image is a scaled representation of the first video image.

12. (Previously Presented) The method of claim 11 further comprising:

storing a representation of the first video image after determining; and

wherein generating a compressed second video image includes generating the compressed second video image based on the one or more second motion vectors and a second video image, wherein the second video image is a representation of the first video image.

13. (Original) The method of claim 12, wherein the scaled representation is a scaled-down representation.

14. (Canceled)

15. (Previously Presented) The method of claim 12, wherein generating the one or more second motion vectors includes averaging at least a portion of the plurality of first motion vectors to represent a vector in the one or more second motion vectors.

16. (Previously Presented) The method of claim 12, wherein generating the one or more second motion vectors includes selecting a most frequently occurring vector in a portion of the plurality of first motion vectors to represent a vector in the one or more second motion vectors.

17. (Previously Presented) The method of claim 11, wherein generating the one or more second motion vectors includes averaging at least a portion of the plurality of first motion vectors to represent a vector in the one or more second motion vectors.

18. (Previously Amended) The method of claim 11, wherein generating the one or more second motion vectors includes selecting a most frequently occurring vector in a portion of the plurality of first motion vectors to represent a vector in one or more of second motion vectors.

19. (Original) The method of claim 11, wherein a number of vectors in the one or more second motion vectors that represents the second video image is different than a number of vectors in the plurality of first motion vectors that represent the first video image, and wherein the second video image is a representation of the first video image.

20. (Original) The method of claim 19, wherein the number of vectors in the one or more second motion vectors is less than the number of vectors in the plurality of first motion vectors.

21. (Canceled)

22. (Withdrawn) A video processing device comprising:
a video input to receive a compressed video input stream utilizing motion vectors;
a downscaling and decompression module responsive to the video input, the downscaling and decompression module to perform compressed video decoding of the compressed video input stream;
a memory buffer, the memory buffer responsive to the downscaling and decompression module;
a video encoder, the video encoder responsive to the downscaling and decompression module and responsive to the memory buffer; and
wherein the memory buffer stores motion vectors retrieved by the downscaling and decompression module when processing the compressed video input stream to

produce a downscaled and decompressed video stream and wherein the encoder retrieves the motion vectors from the memory buffer in connection with encoding the downscaled and decompressed video stream.

23. (Withdrawn) The video processing device of claim 22, further comprising a second memory buffer responsive to the downscaling and decompression module, the second memory buffer to store video data frames provided by the downscaling and decompression module.

24. (Withdrawn) The video processing device of claim 23, wherein the video encoder is responsive to the second memory buffer.

25. (Withdrawn) The video processing device of claim 24, further comprising an output buffer, the output buffer responsive to the video encoder.

26. (Withdrawn) The video processing device of claim 22, wherein a set of motion vectors is determined based upon the motion vectors from the memory buffer and wherein the video encoder uses the set of motion vectors to encode the downscaled and decompressed video stream.

27. (Withdrawn) The video processing device of claim 26, wherein the set of motion vectors is determined by performing an averaging operation on motion vectors retrieved from the memory buffer.

28. (Withdrawn)The video processing device of claim 26, wherein the set of motion vectors is determined by performing a voting operation with respect to motion vectors from the memory buffer.

29. (Withdrawn) The video processing device of claim 28, wherein the voting operation identifies the most frequently occurring motion vector.

30. (Withdrawn) The video processing device of claim 29, wherein the voting operation also includes a tie breaking function, and wherein the tie breaking function uses a random method to select among the candidate motion vectors.

31. (Withdrawn) The video processing device of claim 29, wherein the voting operation also includes a tie breaking function, and wherein the tie breaking function uses a predetermined pattern of choices to select among candidate motion vectors.

32. (Withdrawn) The video processing device of claim 31, wherein a control input is used to set integer values of s and t, where t is an integer greater than one, and where s is an integer greater than zero but less than t, and where a resulting image represented by the downscaled and decompressed video stream is s/t of the size of the image represented by the compressed video input stream.

33. (Withdrawn) A method of processing video data, the method comprising:
receiving a compressed video input stream;
downscaling and decompressing the compressed video input stream to produce a downscaled and decompressed video stream;
determining a set of motion vectors associated with the compressed video input stream in connection with the step of downscaling and decompressing;
storing the set of motion vectors in a memory;
retrieving the set of motion vectors from the memory; and
using the set of motion vectors retrieved from the memory in connection with encoding the downscaled and decompressed video stream.

34. (Withdrawn) The method of claim 33, further comprising storing video data frames provided by the downscaling and decompression module into a second memory.

35. (Withdrawn) The method of claim 34, further comprising using data video frames retrieved from the second memory in connection with encoding the downscaled and decompressed video stream.

36. (Withdrawn) The method of claim 33, further comprising producing an encoded video stream and storing the encoded video stream into an output memory.

37. (Withdrawn) The method of claim 36, further comprising determining a second set of motion vectors based upon the motion vectors retrieved from the memory wherein the encoder

uses the second set of motion vectors to encode the downscaled and decompressed video stream to produce the encoded video stream.

38. (Withdrawn) The method of claim 37, wherein the second set of motion vectors is determined by taking an average of motion vectors from the memory.

39. (Withdrawn) The method of claim 37, wherein the second set of motion vectors is determined by performing a voting operation with respect to motion vectors from the memory.

40. (Withdrawn) The method of claim 39, wherein the voting operation determines the most frequently occurring motion vector.

41. (Withdrawn) The method of claim 39, wherein the voting operation further includes a tie breaking function, and wherein the tie breaking function uses a random method to select among the candidate motion vectors.

42. (Withdrawn) The method of claim 39, wherein the voting operation further includes a tie breaking function, and wherein the tie breaking function uses a predetermined pattern of choices to select among candidate motion vectors.

43. (Withdrawn) The method of claim 33, wherein a control input is used to set integer values of s and t, where t is an integer greater than one, and where s is an integer greater than zero but less than t, and wherein a resulting image represented by the downscaled and decompressed video stream is s/t of the size of the image represented by the compressed video input stream.

44. (Withdrawn) A compressed video transcoder device comprising:

a compressed video input stream that utilizes frame deltas and motion vectors;
a first interface into a first external memory buffer;
a second interface into a second external memory buffer to store motion vectors;
a third interface into a third external memory buffer to store final compressed output;
a control input to set integer values of s and t, where t=2,3,... and s=1,2,...,t-1;
a downscaling decompression block that performs full compressed video decoding connected to the first external memory buffer and second external memory buffer where the resulting image is s/t the size of the original;
a compression block that performs simplified compressed video encoding connected to the first external memory buffer, the second memory buffer, and the third external memory buffer;
said downscaling decompression block storing motion vectors decoded from the input stream into the second external memory buffer; and
said compression block reading motion vectors from the second external memory buffer and writing its output into the third external memory buffer.

45. (Withdrawn) A compressed video transcoder device according to claim 44 wherein at least one of the second and third external memory buffers is the same as the first external memory buffer.

46. (Withdrawn) A compressed video transcoder device according to claim 44 wherein at least one of the second and third external memory buffers is internal to the device.

47. (Withdrawn) A compressed video transcoder device according to claim 44 wherein the compression method is based on an MPEG compression scheme utilizing frame difference with motion vectors where fragments used in connection with the MPEG compression scheme are macroblocks, where the motion vectors are of the form $[(X,Y),(\Delta X_1, \Delta Y_1)]$ or $[(X,Y),(\Delta X_1, \Delta Y_1), (\Delta X_2, \Delta Y_2)]$, and where (X,Y) denotes a current macroblock and each $(\Delta X_k, \Delta Y_k)$ denotes a motion vector component from reference frame k.

48. (Withdrawn) A compressed video transcoder device according to claim 47 where the fragments are any fragment other than the standard square macroblocks of MPEG, and where motion estimation is a required step of compression.

49. (Withdrawn) A compressed video transcoder device according to claim 44 wherein the motion vectors obtained by the decompression unit are stored and then later retrieved by the compression block.

50. (Withdrawn) The compression video transcoder device of claim 49, where a new set of motion vectors is built as follows, each k-th motion vector $(\Delta X_k, \Delta Y_k)_{new}$ = AVERAGE($(\Delta X_k, \Delta Y_k)_A, (\Delta X_k, \Delta Y_k)_B, \ldots, (\Delta X_k, \Delta Y_k)_M$), where M is greater than one.

51. (Withdrawn) A compressed video transcoder device according to 49 where in a new set of motion vectors is built as follows, each k-th frame motion vector $(\Delta X_k, \Delta Y_k)_{new}$ = VOTE($(\Delta X_k, \Delta Y_k)_A, (\Delta X_k, \Delta Y_k)_B, \ldots, (\Delta X_k, \Delta Y_k)_M$) and where the VOTE function retrieves the most frequently occurring vector, with any method to break ties involving an arbitrary choice or a pattern of choices among the candidate vectors.

52. (Withdrawn) A method of processing a video data stream, the method comprising:
initializing a frame encoder;
selecting a macroblock of the video data stream to be encoded;
retrieving motion vectors associated with the macroblock from memory,
building a new motion vector based on the motion vectors retrieved from memory; and
building a delta macroblock based on the new motion vector.

53. (Withdrawn) The method of claim 52, wherein the motion vectors were stored in memory during a previous video decoding process.

54. (Withdrawn) The method of claim 53, further comprising performing a discrete cosine transform for data blocks within the macroblock to produce a transformed macroblock.

55. (Withdrawn) The method of claim 54, further comprising quantizing the transformed macroblock to produce a quantized macroblock.

56. (Withdrawn) The method of claim 55, further comprising variable length encoding the quantized macroblock to produce an encoded macroblock.

57. (Previously Presented) The system of claim 1, wherein the first memory comprises a hard drive.

58. (Previously Presented) The system of claim 1, wherein the first memory coupled to the video decoder is to store all motion vectors used to build a frame of the video input stream.

59. (Canceled)

60. (Previously Presented) The system of claim 1, wherein the system further comprises a scaling input to indicate an amount of scaling to be implemented by the scaler.

61. (Previously Presented) The system of claim 1, wherein:

the video decoder is to receive the video input stream having a first set of motion vectors representing a first frame of video, where the one or more first motion vectors being at least a portion of the first set of motion vectors, and a second set of motion vectors representing a second frame of video; and

the first memory coupled to the video decoder to simultaneously store the first set of motion vectors and the second set of motion vectors.

62. (Canceled)

63. (Previously Presented) The system of claim 1, wherein the decoder and encoder are part of a transcoder processor.

64. (Previously Presented) The system of claim 11, wherein the storing the first motion vectors includes storing the first motion vectors on a hard drive.

65. (Previously Presented) The method of claim 11, wherein the plurality of first motion vectors include all motion vectors used to build a frame of the compressed first video image.

66. (Canceled)

67. (Previously Presented) The method of claim 11, further comprising receiving a scaling indicator to indicate an amount of scaling to be applied to the compressed second video image.

68. (Previously Presented) The method of claim 11, wherein storing the plurality of first motion vectors further storing the plurality of first motion vectors in response to a mode indicator being in a first state.